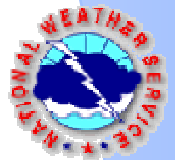
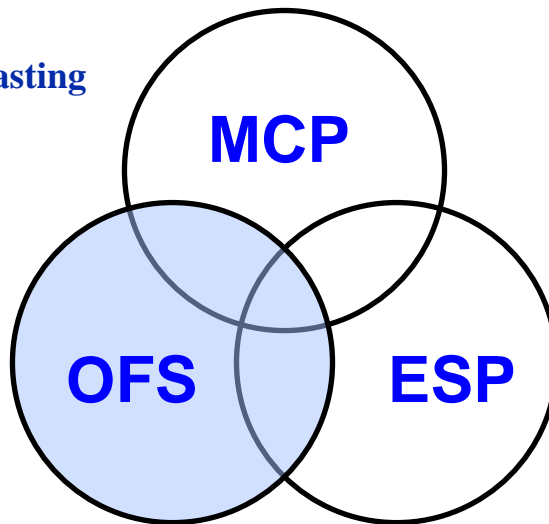


NWSRFS

Operational Forecast System

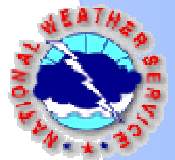
- Manual Calibration Program (MCP) system
- Operational Forecast System (OFS)
- Ensemble Streamflow Prediction (ESP) system

NWS Workshop on Hydrologic Forecasting
Prague Campus
Czech University of Agriculture
June 20-24, 2005

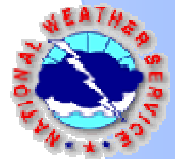
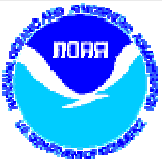
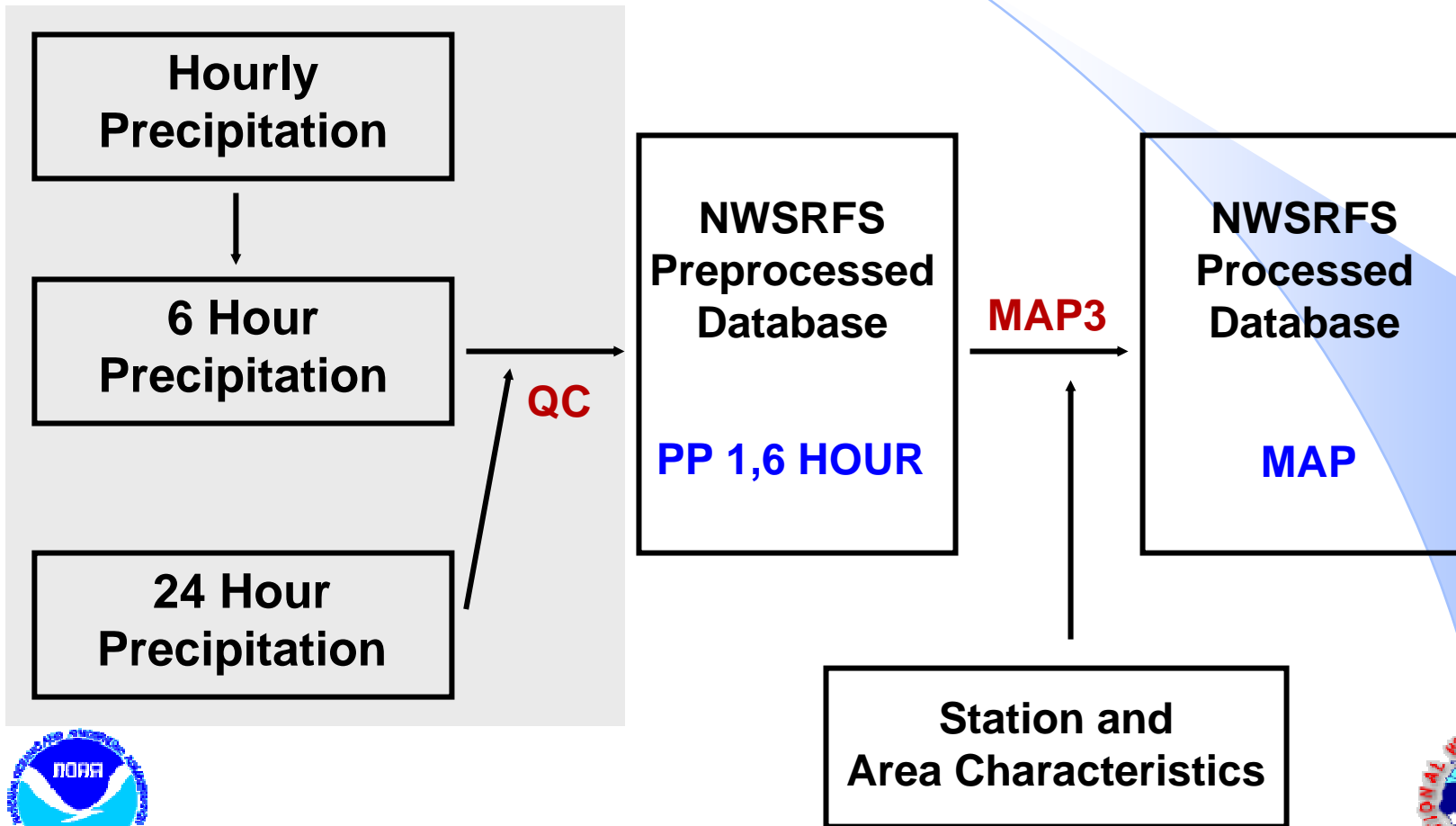


Pre-OFS Activities

- Collect, process, QC precipitation data.
- Collect, process, QC temperature data.
- Collect, process, river/reservoir data.
- Obtain, process forecast precipitation and temperature.
- Obtain anticipated reservoir regulation.

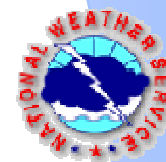
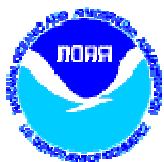


Mean Areal Precipitation (MAP)

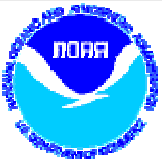
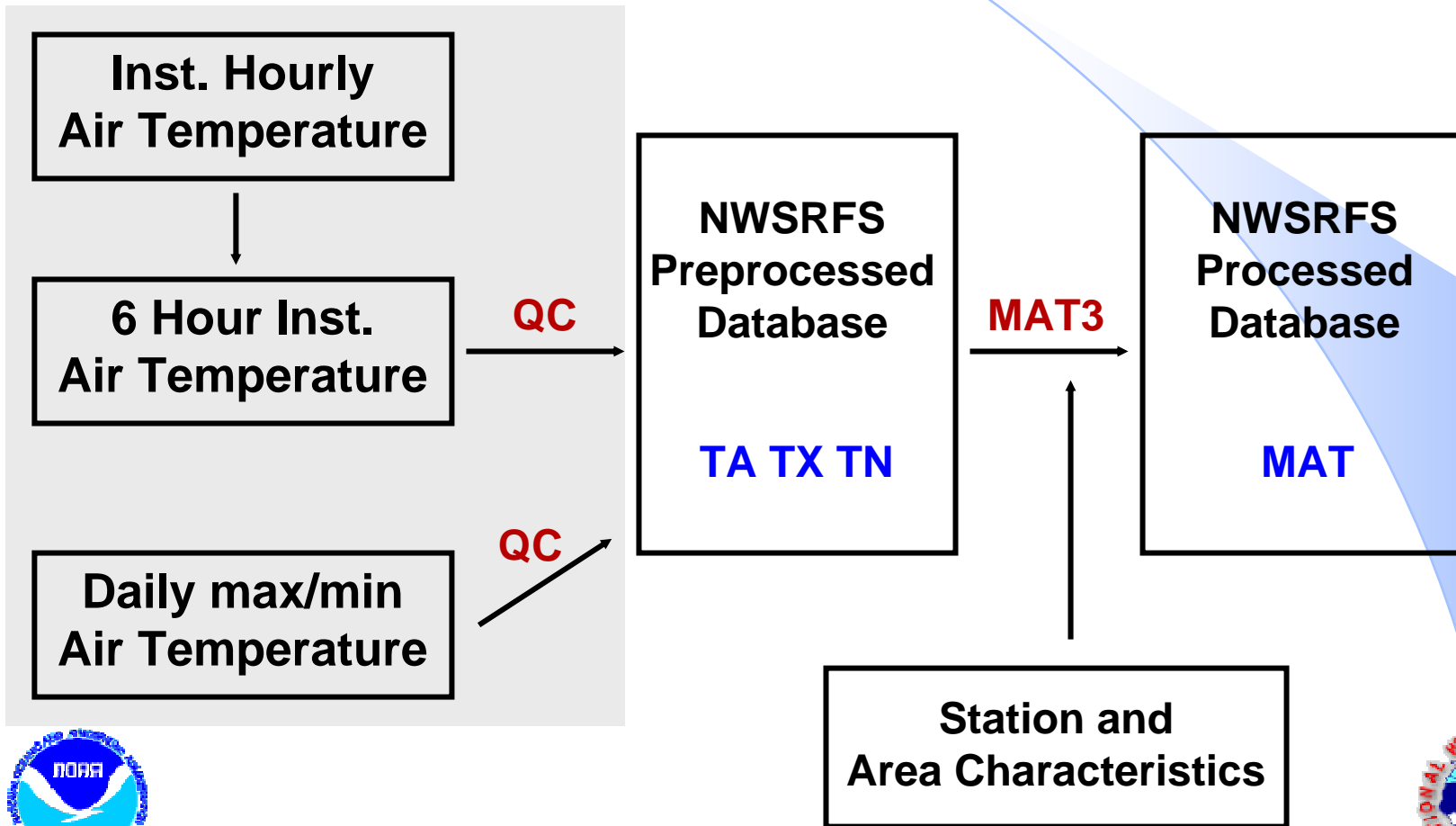


Precipitation Data Quality Control

- Every 1,6 hour period.
- Climatological normalization.
- Threshold and spatial comparisons.
- Systematic estimation.
- Manual forcing and over-rides.
- Output qualified for model use.



Mean Areal Temperature (MAT)

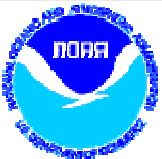
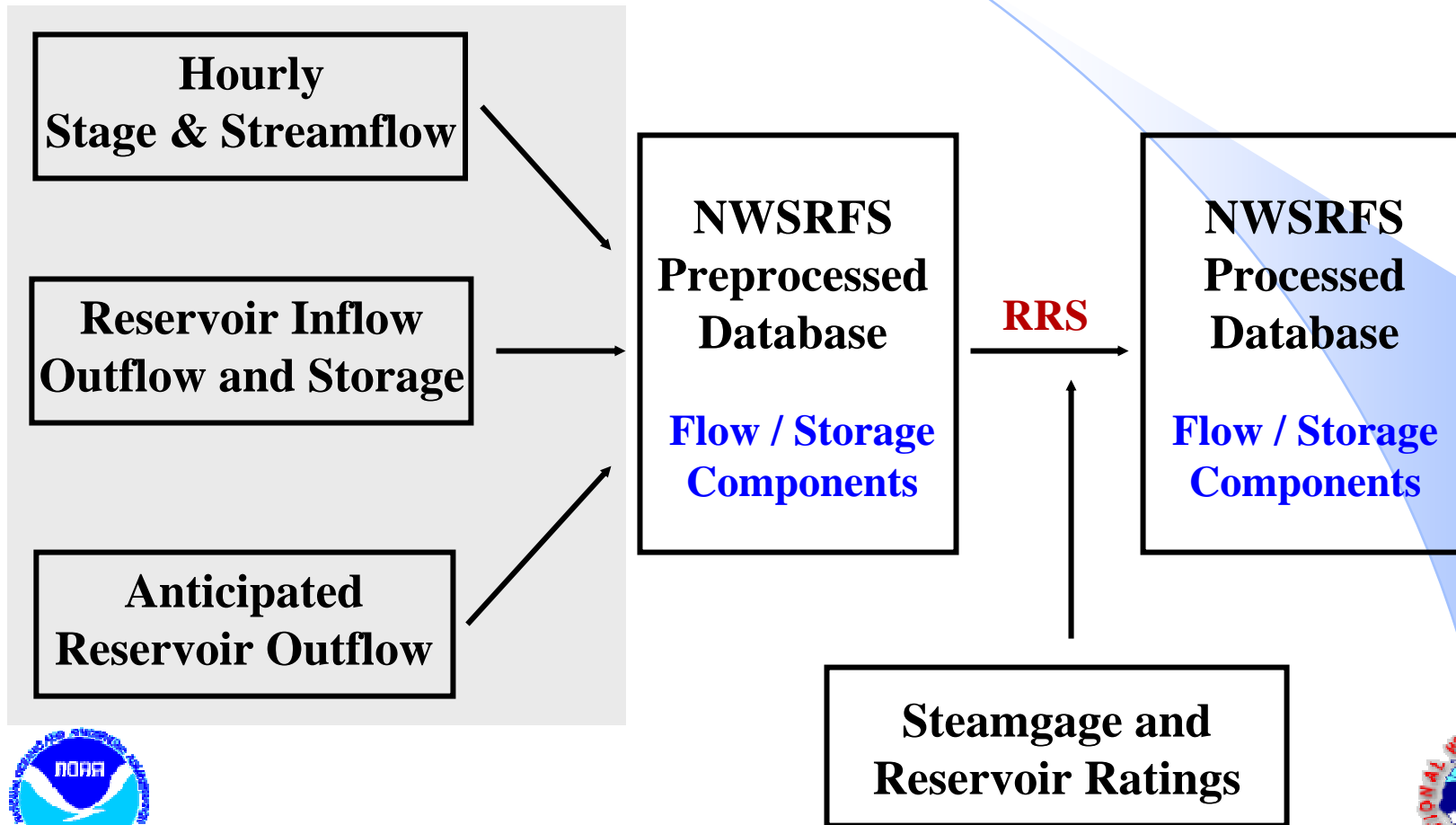


Air Temperature Data Quality Control

- Lapse to mean observational elevation.
- Compute mean and standard deviation.
- Identify and estimate outliers and missing observations.
- Post validated observations and estimates for outliers and missing observations.



River and Reservoir Data (RRS)



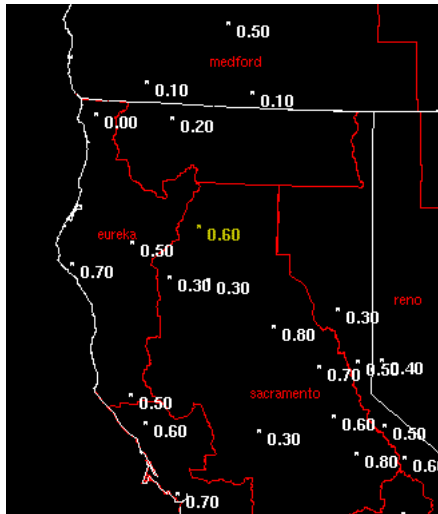
River and Reservoir Data Quality Control

- No external system.
- Quality controlled in the context of simulated streamflow.

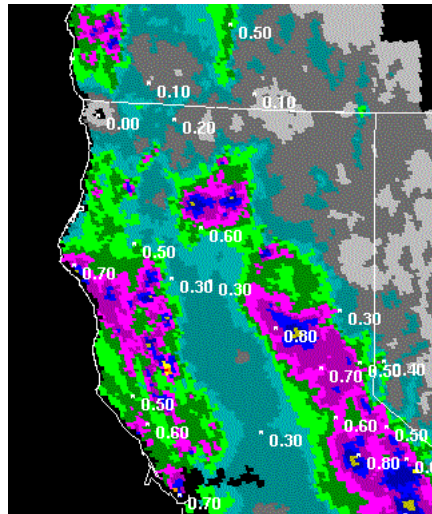


Quantitative Precipitation Forecasts

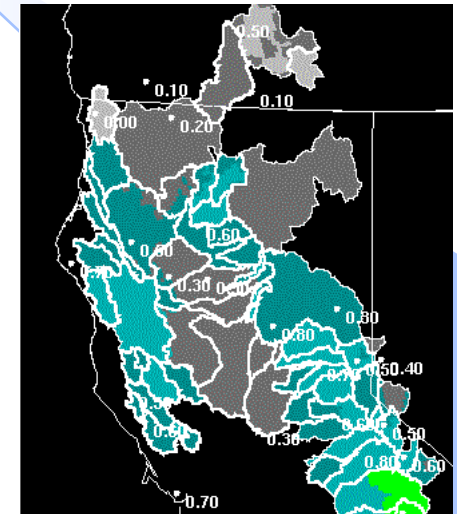
Points



Grids



MAPs



**Climatological Normalization
and Distance Weighting**

**Integration within
Basin Boundaries**



Forecast Mean Areal Precipitation

```

$East Side
MOD
.FMAP6 05219910PST
$
      10   16   22   04       10   16   22   04       10   16   22   04
TAHFMAP    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0
LFARFMAP    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0
UFARFMAP    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0
RNKN2LWL    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0
RNKN2UPL    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0
SCRN2LW     0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0
SCRN2UP     0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0
VISN2LWL    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0
VISN2UPL    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0
WFCFMAP     0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0
LECFMAP     0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0
UECFMAP     0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0
STWN2LWL    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0
STWN2UPL    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0
LWWFMAP     0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0
UWWFMAP     0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0
LEWFMAP     0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0
UEWFMAP     0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0    0.0  0.0  0.0  0.0
ENDMOD
  
```



Forecast Rain-Snow Elevation

```

$East Side
.TSCHNG 05219910PST 05219910PST
TAHC1    TAHC1    RSEL  6  10700  11200  12500  13200  &
                                     13700  14300  14600  14700  &
                                     14700  14700  14800  13000  &
                                     10900  10900  10900  11100  &
                                     11100  11300  11300  11200  SNOW-17
FARC1    FARC1    RSEL  6  10700  11200  12500  13200  &
                                     13700  14300  14600  14700  &
                                     14700  14700  14800  13000  &
                                     11000  11000  11000  11200  &
                                     11200  11200  11200  11200  SNOW-17
RNKN2    RNKN2    RSEL  6  10700  11200  12500  13200  &
                                     13700  14300  14600  14700  &
                                     14700  14700  14800  13000  &
                                     10900  10900  10900  11100  &
                                     11100  11300  11300  11200  SNOW-17
SCRN2    SCRN2    RSEL  6  10700  11200  12500  13200  &
                                     13700  14300  14600  14700  &
                                     14700  14700  14800  13000  &
                                     10900  10900  10900  11100  &
                                     11100  11300  11300  11200  SNOW-17
    
```



Interactive Forecast Program

Select Forecast Group and Carryover Date

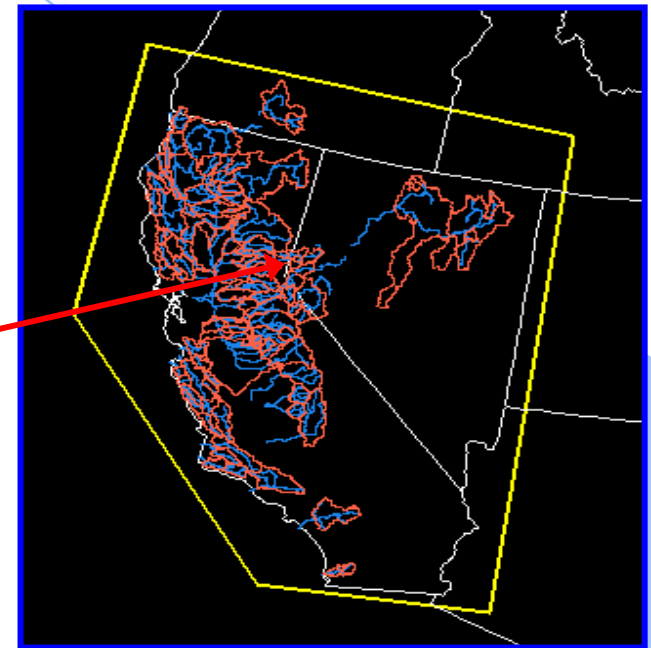
NWS River Forecast System Interactive Forecast Program

Forecast Group	Carryover Group	Carryover dates
NCOAST	CNRFC2	
RUSNAP	CNRFC4	
CCOAST	CNRFC7	
UPRSAC	CNRFC3	
LWRSAC	CNRFC5	
UP SNJOQ	CNRFC6	
LW SNJOQ	CNRFC9	
ESIERRA	CNRFC	
SOCAL	CNRFC8	

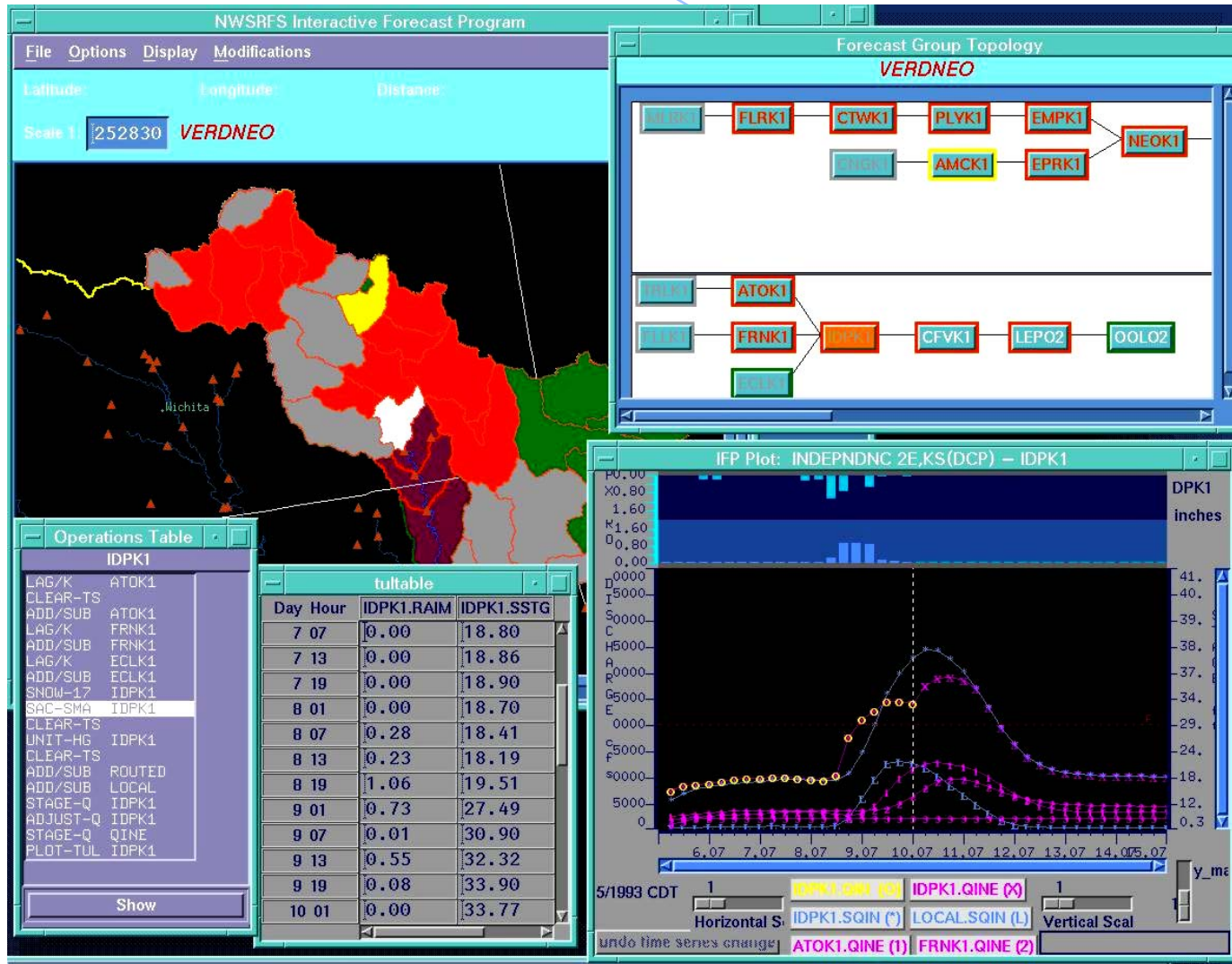
Use copy of current OFS files

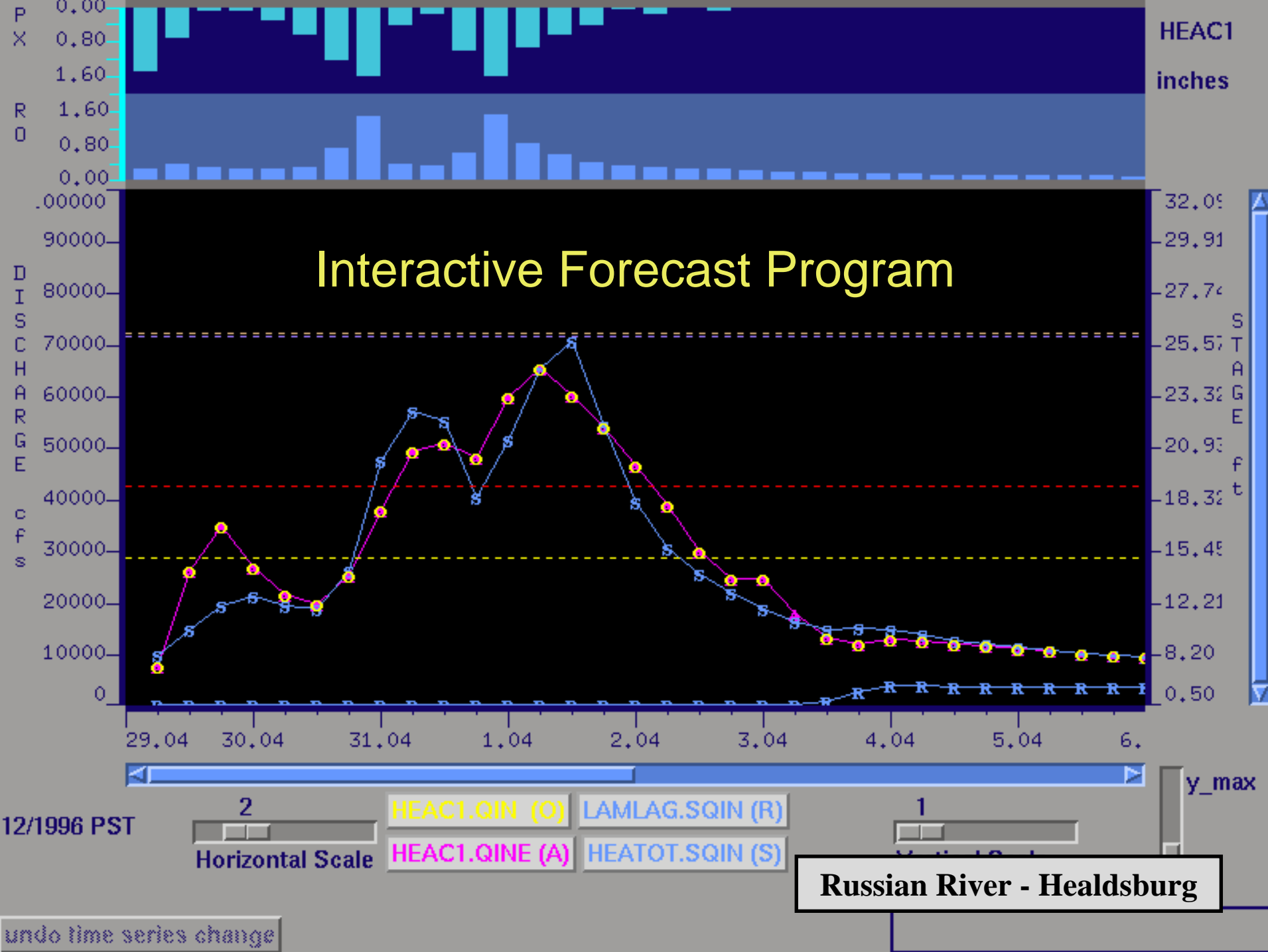
Files last copied from OFS: Fri May 21 08:13:05 PDT 1999
Mods last copied to OFS:

Load Cancel Help



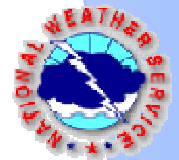
Interactive Forecast Program





IFP Data Table

tultable						
Day Hour	HEAC1L.RAIM	HEAC1.QINE	HEAC1.SQIN	HEAC1L.SQIN	HOPC1R.QINE	HEAC1L.MAP
10 04	0.00	340.00	277.10	143.43	210.00	0.00
10 10	0.00	350.00	276.47	142.80	210.00	0.00
10 16	0.00	340.00	265.77	142.09	200.00	0.00
10 22	0.00	340.00	265.15	141.48	200.00	0.00
11 04	0.00	330.00	256.14	140.92	193.55	0.00
11 10	0.00	330.00	262.00	140.32	200.00	0.00
11 16	0.00	320.00	261.30	139.62	200.00	0.00
11 22	0.00	330.00	270.69	139.01	210.00	0.00
12 04	0.00	330.00	268.14	138.46	210.00	0.00
12 10	0.00	330.00	267.55	137.86	210.00	0.00
12 16	0.00	340.00	266.85	137.16	210.00	0.00
12 22	0.00	330.00	266.24	136.56	210.00	0.00
13 04	0.00	330.00	273.69	136.00	220.00	0.00
13 10	0.00	330.00	263.10	135.41	210.00	0.00
13 16	0.00	328.90	262.40	134.71	210.00	0.00
13 22	0.00	337.89	271.79	134.10	220.00	0.00
14 04	0.00	334.95	269.25	133.55	220.00	0.00
14 10	0.00	334.56	269.26	132.96	220.61	0.00
14 16	0.00	335.00	270.10	132.26	222.15	0.00
14 22	0.00	333.19	268.70	131.65	221.35	0.00
15 04	0.00	330.05	265.96	131.10	221.15	0.00
15 10	0.00	328.90	265.21	130.51	220.99	0.00
15 16	0.00	327.73	264.45	129.81	220.93	0.00



IFP Operations Table Display

Parameters for Operation SAC-SMA HEAC1L

Control

SACRAMENTO SOIL-MOISTURE ACCOUNTING OPERATION FOR HEALDSBURG LOCAL
COMPUTATIONAL TIME INTERVAL IS 6 HOURS.
TIME SERIES USED BY THIS OPERATION.

CONTENTS	I.D.	TYPE	TIME INTERVAL
RAIN+MELT	HEAC1L	RAIM	6 HOURS
CHANNEL INFLOW(RUNOFF)	HEAC1L	INFW	6 HOURS
AREAL EXTENT OF SNOW	HEAC1L	SASC	24 HOURS
RUNOFF COMPONENTS	HEAC1L	ROCL	24 HOURS
SOIL STORAGE CONTENTS	HEAC1L	SMZC	24 HOURS

SUMS OF WATER BALANCE VARIABLES ARE STORED.

PARAMETER VALUES - CAPACITIES ARE IN MM.

PX-ADJ	PE-ADJ	UZWIM	UZFWIM	UZK	PCTIM	ADIMP	RIVA
1.000	1.000	60.	20.	.350	.010	.043	.020
PBASE	ZPERC	REXP	LZWIM	LZFSM	LZFPM	LZSK	LZPK
15.8	8.0	1.90	140.	100.	125.	.1500	.0060

16TH OF MONTH VALUES

	1	2	3	4	5	6	7	8	9	10	11	12
ET-DEMAND-MM/DAY	1.2	1.3	1.6	2.4	3.7	6.6	8.1	8.1	7.1	4.0	1.8	1.2

SOIL-MOISTURE CONTENTS(MM) FOR HEALDSBURG LOCAL

UZWIM	UZFWIM	LZWIM	LZFSC	LZFPC	ADIMC
13.	.0	96.	.0	69.	100.

Operations Table

HEAC1

RSNWELEV HEAC1L
SNOW-17 HEAC1L
SAC-SMA HEAC1L
CLEAR-TS
UNIT-HG HEAC1L
CHANGE-T HEAC1_1
CLEAR-TS
LAG/K HOPC1
CLEAR-TS
ADD/SUB HOPC1R
ADD/SUB HEAC1L
CHANLOSS HEAC1
ADJUST-Q HEAC1
CHANGE-T SQIN_6
CHANGE-T QINE_6
CHANGE-T HOPC1_6
PLOT-TUL HEAC1INS
STAGE-Q HEAC1

Show

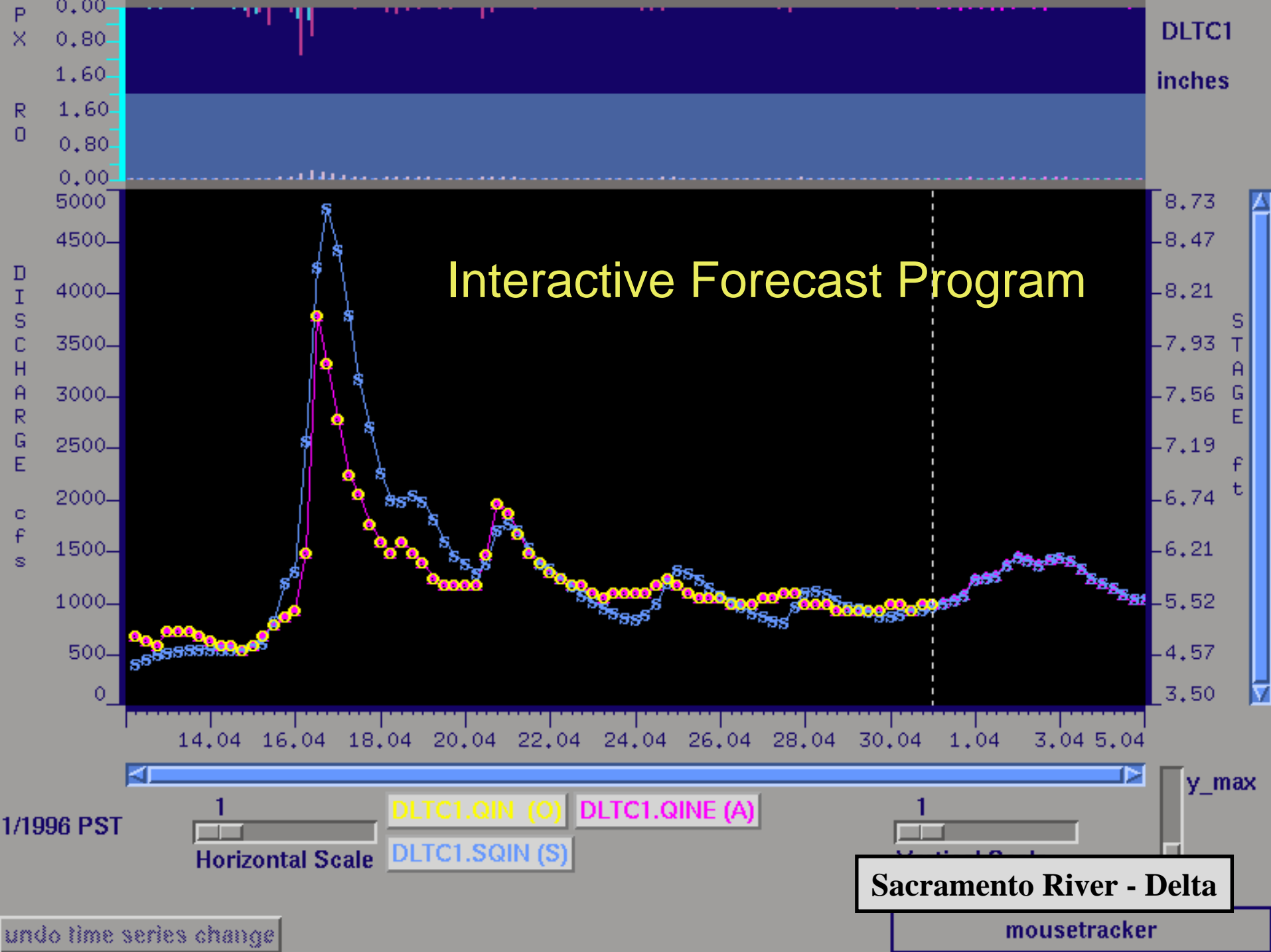


IFP Runtime Modifications

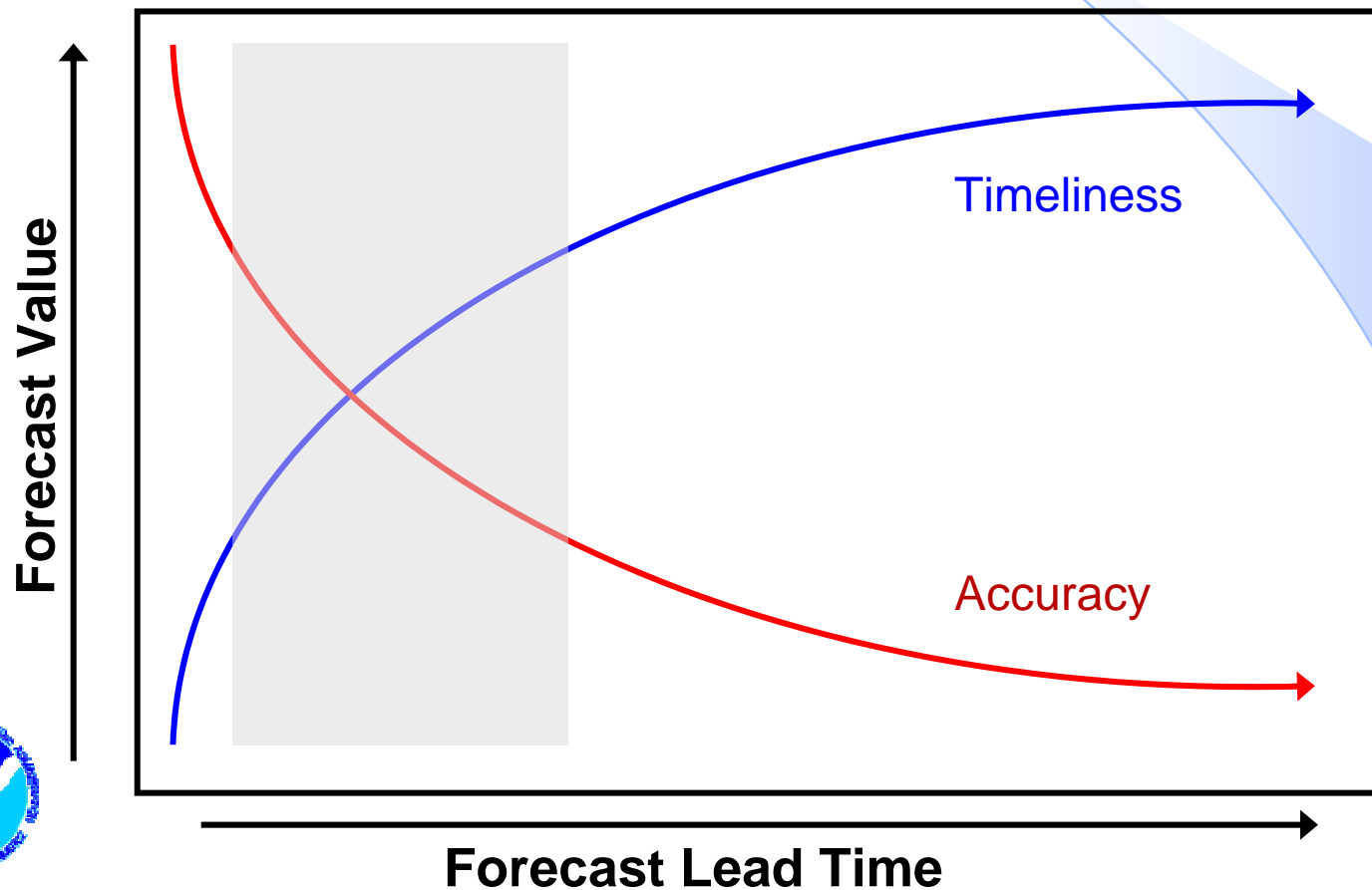
Mods for: LAMC1

Available Operations	Available Run-time Mods
Show Mods for: <input type="button" value="ALL"/>	Mod selected: <input type="button" value="AESCCHNG"/>
Mod Value <input type="text" value="1.000000"/> <input type="button" value="Dimensionless"/>	Operation Type / Name <input type="button" value="SNOW-17 LA"/>
Mod Dates Start of Mod <input type="button" value="Jun"/> <input type="button" value="13"/> <input type="button" value="2000"/> <input type="button" value="4"/> <input type="button" value="PST"/> <input type="button" value="Previous"/> <input type="button" value="Next"/>	Time-series No date values
Options No options for this Mod Apply to: <input type="button" value="SEGMENT"/>	Display <input checked="" type="checkbox"/> Show Mods





Balancing Timeliness and Accuracy



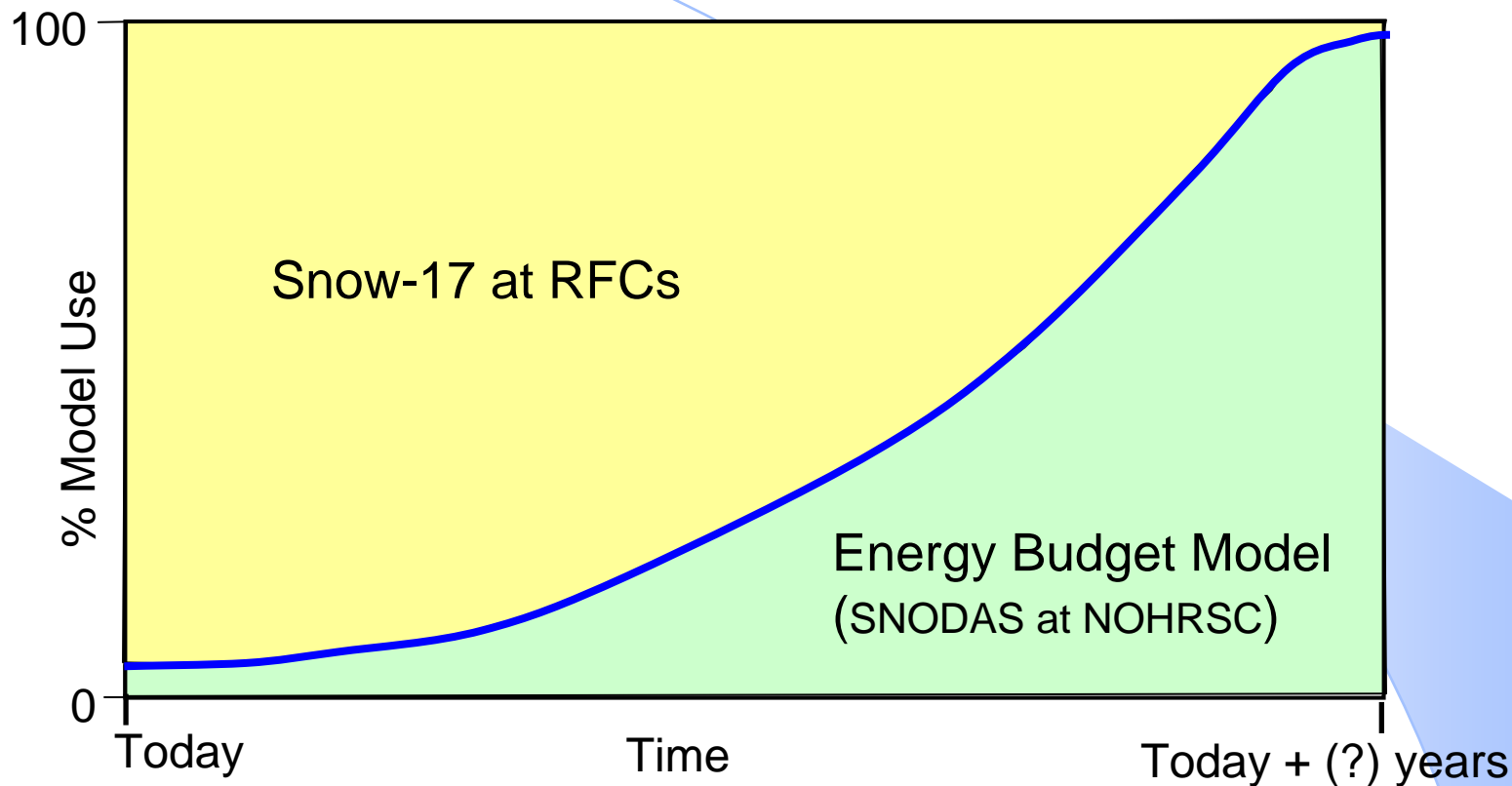
The End

Operational Forecast System (OFS)





Transition from Snow-17 to Energy Budget Model for RFC Operations: HL Activities



- Distributed Snow-17
- New data for Snow-17 (wind speed, etc)
- Sensitivity of Energy Budget model to data errors
- Snow-17 MODs based On Snodas
- Calb-OFS biases
- Use of Snodas Output in Snow-17
- Use of Snodas Output in runoff models

